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ENDING EVACUATIONS

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There is little research describing the process by which organizations decide to issue the "all-clear" to terminate an evacuation and of the process by which evacuated families decide to return to their homes. These processes are inherently more problematic in evacuations triggered by chemical or radioactive agents than is usually the case in evacuations occasioned by natural disasters. This paper presents some examples of toxic chemical evacuations as background for an examination of the process of terminating evacuations. The "all-clear" message and the pre-disaster warning message are taken as analogous, as are the decisions to evacuate and to return. Variables that research has shown explain warning and evacuation behavior are evaluated in relation to the all-clear and return. Ending evacuations where toxic agents are concerned are more problematic because there is greater conflict which in turn lessens the credibility of all-clear messages. Both the sources of these differences and their consequences are explored.

Ending evacuations is a topic that has generated little interest among disaster researchers (Quarantelli 1980, p. 130). There is no discussion in major reviews of the research literature of the organizational dynamics surrounding the decision to issue an "all-clear" or of the correlates of peoples' decisions to return to their residences (e.g., Drabek 1986; Quarantelli and Dynes 1977; Mileti et al. 1975). In contrast, researchers consider the response to warning messages and the decision to choose evacuation as a pre-disaster adjustment strategy to be more problematic, and the number of hypotheses advanced to explain these two patterns is extensive (e.g., Drabek 1986, pp. 70-131).

Ending evacuations prompted by the presence of chemical or toxic agents, however, can be as problematic as their initiation. This paper explores some of the problems of ending evacuations following chemical emergencies by treating the process of issuing an "all-clear" as analogous to issuing a pre-disaster warning and the decision to return as analogous to the decision to evacuate. This makes it possible to examine the variables

which explain the initiation of evacuation to see if they also describe patterns in the termination of evacuations.

There is a major difference in ending evacuations in which people are anxious to return and in ending those in which evacuees are reluctant or even unwilling to return even after receiving the all-clear. The latter possibility is greater where the emergency results from chemical or radioactive agents rather than from wind or rainfall. In extreme cases, evacuees may to believe that a normal existence is possible only in a new location. They may be unconvinced that the old location can ever be made safe again. All-clear messages under these circumstances may be less welcome invitations to resume life as usual than efforts to force people to accept what they perceive as against their will.

This paper is more a research proposal than a research report. That is, it identifies research needs in an area where little research has been. The exploration begins by comparing one more or less typical evacuation in a natural disaster with descriptions of four toxic chemical-related evacuations varying in degrees of extremity. These examples provide a baseline for identifying the special problems in ending evacuations where toxic chemicals are involved. A final section contains some tentative research and policy recommendations based on this exploratory effort.

EXAMPLES

Evacuations in advance of natural disasters have many common features even though no two are identical in every respect.

Flooding Along the Lower Platte River

The following description, condensed from Perry et al. (1980), is representative.

> Valley is a small community on the Platte River a few miles northwest of a major midwestern rail and commercial center. [...It] has a long history of spring floods.
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> In mid-March of 1978, the National Weather Service issued a flood watch for the lower Platte, bringing to the attention of the news media the presence of ice jamming and lowland flooding along the river. Although attempts were made to break up the ice, rising water resulted in the erosion of Union Dike located approximately three miles north of Valley on the evening of March 19.... This marked the beginning of the most severe flood in the town's history. Most of the private residences in Valley experienced some water damage, ranging from basement flooding to major structural failure. Water, sewer and natural gas lines were damaged and services interrupted. These problems kept most residents from their homes at least 48 hours and many could return only after four or five days.
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> Virtually all of the town's residents received advance warning of the flood. On Saturday, March 18, the Volunteer Fire Department initiated patrols of the levee which protects Valley. Thus, when Union Dike began to crumble on the evening of the 19th, the problem was detected promptly and warning radioed to Valley as well as other nearby communities. Water did not reach Valley for approximately three hours.... Warnings to evacuate were issued via public address systems on emergency vehicles and door-to-door. Civil defense sirens were also used to issue an evacuation alert. Most residents were warned a minimum of 30 minutes prior to flood impact and some had 3 hours notice. These remarks refer to a warning to **evacuate** because of imminent danger; the mass media had "warned" that the ice jams **could** produce flooding for two days prior to impact. Approximately 90 percent of the households and one large nursing home were evacuated by the next morning. About three-fourths of these evacuations were accomplished prior to impact.
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> Most people were gone from their residences at least four days, the period necessary to reestablish basic services in the community. (pp. 24-27)

This short excerpt contains many features common to evacuations prior to natural disasters. There is a visible threat, in this case spring rain and rising water levels. The different pieces of information are consistent and reinforce the reality of the threat; the information comes from sources who are credible and whose reputations in such matters are relatively untarnished; there are previous experiences with flooding at this time of year. Terminating the evacuation is so non-problematic that it is not described but is implicit in the reference to the number days evacuees had to remain away from their homes.

Three Mile Island

Evacuating in toxic, chemical, or radiation emergencies is similar to that in flood and other natural disasters (Stallings 1984; 1979). However, returning can be much more problematic for public officials and evacuees alike. The next four examples differ substantially from the evacuation along the lower Platte River. The first is a summary of the voluntary evacuation

associated with the accident at the Three Mile Island (Pennsylvania) nuclear energy plant in the spring of 1979. The summary is condensed from Stallings (1984).

> On Wednesday, March 28, 1979, news of predawn trouble inside the Unit 2 reactor at Three Mile Island was beginning to emerge in piecemeal fashion. At mid-morning, Pennsylvania's lieutenant governor told reporters: "There is and was no danger to public health and safety" (*Allentown [PA] Morning Call* March 29, 1979). However, later that same day he said: "This situation is more complex than the company first led us to believe" (*Allentown Morning Call* March 29, 1979).
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> A physicist, speaking Thursday morning on a radio talk show broadcast from Pittsburgh advised pregnant women living within two miles of the Unit 2 reactor to leave the area at once. State and local emergency preparedness officials subsequently discussed the possibility of an evacuation but took no immediate action. On Friday, following the accidental release of radioactive gases into the atmosphere, officials of the Nuclear Regulatory Commission (NRC) recommended an evacuation to local officials, and the public-at-large was notified of the possibility of an evacuation by the state's emergency preparedness agency.
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> At a mid-morning press briefing on Friday, the governor's press secretary read a prepared statement advising all persons within a ten-mile radius of Unit 2 to remain indoors with their windows closed. A local college canceled classes for the remainder of the day and for the first two days of the following week as well. Several elementary and secondary schools also closed early. Air raid sirens sounded without explanation in nearby Harrisburg, the state capital. The governor issued a second advisory later that same day. This one recommended that pregnant women and preschool children living within five miles of the reactor leave the area temporarily. The Friday evening edition of Harrisburg's major newspaper carried further reports: the National Guard was readying for a possible alert; the state fairgrounds were being prepared as an evacuation center; 130 evacuees already had moved into a municipal arena; and the capital experienced traffic jams as 15,000 state employees were sent home shortly after the accidental release.
>
> Saturday's newspapers contained further details of the unofficial evacuation. A councilman from one of the small villages near the Unit 2 reactor reported that 40 percent of the residents had already left. Emergency preparedness officials were reported to be preparing plans for evacuating five- and ten-mile areas around the reactor site. Another story described the removal of 300 senior citizens from area retirement homes. On Saturday afternoon the governor released the following statement: "My advisory that pregnant women and preschool children stay out of the area within five miles of the plant site will remain in effect for at least another night. Evacuation of a broader nature continues to be unnecessary at this time. A decision regarding school closings and leave policy for state employees will be made and announced as soon as possible Sunday."
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> Sunday papers on the first day of April contained more evacuation news. One article reported that an estimated 50,000 people had left the county in which the Unit 2 reactor was located. Another quoted the county's emergency preparedness director as advising those who remained to leave if they felt "uncomfortable" about the situation. Residents within five miles of the plant who lacked their own means of transportation were urged to notify local officials so that there would be no last-minute problems if an evacuation were ordered.
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> Evacuation stories continued in Monday's and Tuesday's editions. There were reports that plans were complete for evacuation of a 20-mile radius around the plant; that absenteeism among state employees was running 250 percent above normal; that local hospitals were "severely understaffed" due to absenteeism; that there were plans to move newborn babies and other patients out of local hospitals; and that an estimated 200,000 people had evacuated the area around the plant.
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> Accounts in Wednesday's newspapers were different. There were reports of schools reopening and of the elderly being returned to their retirement centers. An evacuation center was closing. The evacuation was ending. Uneasiness about long-term health effects, popular protest and activism, litigation, etc., were just beginning.

Several differences emerge between the Platte River flood and the Three Mile Island examples. In the latter case, the information from officials was ambiguous at best and contradictory at worst. There were carefully worded advisories of various sorts but no clear-cut order to evacuate. Simultaneously, there was news of evacuation preparations and descriptions of a massive, unofficial evacuation already underway. Finally, there were behind-the-scenes efforts to control the impression of what was happening

which included a decision by members of the White House staff to stress the word "accident" rather than "disaster" or "catastrophe" (as in nuclear disaster or nuclear catastrophe).

The BKK Landfill

In the following example, not only was the evacuation much longer than in the previous two examples, but the return was more problematic as well. Economic sanctions finally had to be applied to force the last of the evacuees to return to their homes. This is an abridged description from Stallings (forthcoming).

> The BKK Landfill (named for its owners, Ben and Ken Kazarian) is a 583-acre site in West Covina, California, a suburban community of approximately 100,000 population 20 miles east of downtown Los Angeles. It was the largest commercial hazardous waste management facility in California and the only operating facility of its kind within a 150-mile radius of Los Angeles where 80 percent of the state's toxic waste is generated. Over 840 million gallons of hazardous liquids were deposited on 92 acres of the site since the 1960s, with an additional 157 acres used for disposal of municipal waste and sewage treatment sludge.
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> Trouble at the landfill first began when concentrations of vinyl chloride were detected in one of the new housing developments adjacent to the site in 1981. Eighteen months later high readings of trichloroethylene (TCE), perchloroethylene (PCE), and ethyl dichloride were also detected. The EPA publicly questioned the landfill's ability to contain liquid on-site in early 1984, noting that liquids were migrating past two underground containment barriers. A few weeks later vinyl chloride readings increased along the southern boundary of the BKK property, and contaminated ground water was found in a well 400 feet west of an outer containment barrier. Further geological analysis disclosed that the southern underground barrier had been constructed on a bed of cracked shale and that contaminated ground water had migrated 1,000 feet beyond it.
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> On Tuesday, July 17, 1984, a crew from the regional electric utility detected heavy concentrations of methane gas in the residential subdivision along the southern border of the landfill. Gas company crews quickly summoned to the scene determined that the gas was coming from **inside** several of the houses, not from the utility's transmission lines. At 8:40 p.m., 17 families were evacuated. Two additional families were evacuated when concentrations of vinyl chloride 90 times greater than allowable state limits were discovered in their homes. The evacuated families were taken first to a temporary shelter in a nearby public park. Four families spent the night in motels while the others stayed with relatives or friends. Two families were allowed to return to their homes the following day, but one week later two additional families were evacuated after vinyl chloride was discovered in their homes. All 19 families subsequently moved into a residential motel with rooms and a meal allowance paid for by the City of West Covina which in turn was to be reimbursed by the BKK Corporation. Four weeks after the initial evacuation the state health department announced that eight of the 19 families could reoccupy their homes. The eight families were in no hurry to return, however. At a show-down meeting with representatives of the EPA, the health department, and the city, city officials announced that housing and meal subsidies would be immediately suspended unless the eight families agreed to return to their homes as soon as possible.
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> The threatened economic sanctions failed. The eight families decided to remain in the residential motel at their own expense. Two weeks later each family received $175, money raised through donations from their non-evacuated neighbors that had been matched by a local attorney representing some of the evacuees in a class-action law suit against BKK A car wash held in mid-September raised another $1,500, and proceeds from two subsequent bake sales were donated to the evacuees. A second car wash was held in October. By this time the City of West Covina listed its costs for feeding and housing the evacuees at $175,240.
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> Non-evacuees in the neighborhood faced uncertainties as well. Trichloroethylene (TCE) turned up in two of the already-evacuated homes in late August, and a rumor that 50 more homes would have to be evacuated made its way into most of the local radio and television news broadcasts. Speculators offering to pay cash for homes in the neighborhood—but at less than half their pre-evacuation prices—added to homeowners' concerns over what long-term effect BKK's problems might have on the value of their property. Several homeowners refused the state permission to drill new gas monitoring wells on their property for fear that the mere presence of probes would further reduce the value of their homes.

> As the December holidays neared, ten evacuated families were still living at the residential motel. All ten received letters in early December from the EPA and the state health department stating that methane and vinyl chloride levels were now safe enough for them to return home. The local newspaper in an editorial declared that the health hazard was over. However, one of the ten families still refused to return and only did so in early January 1985 when BKK refused to provide any further food and housing subsidy.

The BKK example differs from the Platte River flood evacuation in several ways. For one thing, the decision to return was complicated by the fact that the health risks could reoccur at any time. This possibility also created an economic risk that homeowners faced in the form of a decline in their value of their homes. In the attempts to influence electoral and legislative outcomes by various political action committees (some cleverly disguised) funded and controlled by BKK and a loss of credibility by public agencies who repeatedly proclaimed the landfill to be same before publicly confessing to "miscalculations" after the evacuation.

Dioxin in Times Beach

More extreme is the relocation (i.e., permanent evacuation) of residents of Times Beach, Missouri. This overview is based upon the account by Eagleton (1991).

> Before it closed in January 1972 only a little more than two years after its creation, the Northeastern Pharmaceutical and Chemical Company of Verona, Missouri, produced roughly 2.5 million pounds of hexachlorophene. St. Louis waste hauler Russell Bliss disposed of more than 13,000 gallons of toxic byproducts of this production process by mixing it with waste oils he then sprayed in horse stables and on unpaved streets and parking lots to control dust. Mr. Bliss's firm sprayed 40,000 gallons of contaminated waste oils on the 23 miles of unpaved streets in Times Beach.
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> Deaths of numerous birds and animals and the illness of several children led to an investigation by the University of Missouri Veterinary School, the Missouri Department of Health, and the Centers for Disease Control (CDC) in 1972. In August 1974 the CDC notified the state health department that it had found dioxin in soil samples. No action was taken because at the time experts believed that dioxin in the soil would quickly decompose.

> When the Environmental Defense Fund identified Times Beach as one of 55 actual or potential dioxin sites in Missouri in 1982, residents were angered that the federal government had not warned them of the hazard years earlier. The Environmental Protection Agency (EPA) proposed a two-year investigation into the matter, but the angry reaction of local residents and the adverse publicity nationwide prompted the EPA to propose a new, shorter timetable. Before the investigation was completed, flooding of the Meramec River forced the evacuation of Times Beach and spread dioxin into its water supply. On December 23, 1982 the CDC and the state health department issued a joint advisory: "Residents who have been temporarily relocated [due to the flood] are discouraged from moving back into the area.... Residents who have already begun to move back into the area are encouraged to leave" (quoted in Eagleton 1991, p. 67). Most residents agonized over what to do. Families with young children generally seemed to move out immediately while older residents were apparently more likely to stay even though their drinking water was contaminated.
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> An emergent group made up of Times Beach residents began to press for a government buy-out of their homes. Pressure was applied on the EPA through the Missouri congressional delegation and as a result of widespread news coverage of public meetings. Finally, after a year of negotiations between the EPA and the State of Missouri the EPA director announced on February 22, 1983 that the government would buy the entire town of Times Beach with $33 million from the federal Super fund and $3.7 million from the state. Plans called for ridding the town of dioxin and turning it into a state park. (pp. 65-76)

In the background of this evacuation was a series of incidents the EPA, the key agency in the decision to allow or not allow residents to return to Times Beach. The new policy of deregulation, of getting the federal government out of peoples' lives, was underway. There were investigations into the handling of the Super fund and of conflict of interest on the part of Rita Lavelle who was soon to be convicted of perjury and sentenced to prison (EPA director Ann Burford would subsequently resign). In its handling of the Times Beach situation, the EPA always seemed to be caught withholding information or to be caught off-guard by the disclosure of new information from other federal agencies. Its public credibility at the time of the buy-out decision had been badly damaged for Times Beach residents.

Love Canal

The saga of Love Canal, the infamous trench in Niagara Falls, New York where the Hooker Electrochemical Company dumped 21,000 tons of chemical waste—including toluene and dioxin—in the late 1940s, is well known (Levine 1982). The following brief description completes the examples of toxic evacuations.

> In August 1978, New York Health Commissioner Robert Whalen recommended that "families with pregnant women" and the "approximately 20 families" living on the streets bordering the southern end of Love Canal "with children under 2 years of age, temporarily move from the site as soon as possible."... In contrast to this rather modest set of recommendations, by the summer of 1981, more than 500 families had moved out—with their homes purchased by the state; hundreds more purchase applications were pending....
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> After the U. S. Congress approved an emergency appropriation in the summer of 1980, allowing the president to spend up to $20 million to relocate Love Canal families..., there were weeks of negotiations between the Federal Emergency Management Agency (FEMA) and the state task force representatives. They finally agreed that the federal government would lend the State of New York $7.5 million at 8.25 percent interest and would grant them another $7.5 million, while the state provided $5 million in revitalization funds....
>
> The final arrangement was complex, and it was not lost on the residents that negotiations took place against a background of conflict between the governor of New York and the incumbent president about the amount of support the governor would give to the president in the upcoming 1980 election.... The agreement was finally signed on October 2, 1980. Home purchases and neighborhood revitalization were then administered through the Love Canal Revitalization Agency.... (p. 213)

Ten years and $250 million later, a containment system of dense clay walls and caps cover 62 acres at the canal site. Although 239 homes immediately adjacent to the canal were demolished, 236 other homes were to be sold beginning in August of 1990 after the Environmental Protection Agency declared the area "habitable" earlier in the year. James Carr, planning director of the Love Canal Area Revitalization Agency, told *Newsweek* (July 30, 1990, p. 25) that "A child runs far, far greater health

risks if his parents smoke or drink than he does living in Love Canal." However, environmental and citizens groups sued to block the sale of the properties. More than a decade after the original evacuation, in other words, there is still disagreement about the risks of living near the Love Canal toxic waste disposal site.

SPECIAL PROBLEMS IN ENDING TOXIC EVACUATIONS

This discussion rests on an initial assumption that responses to "all-clear" messages and decisions to terminate evacuations vary as a function of the same forces that determine responses to warning messages and decisions to evacuate. It is therefore possible to identify those features of emergencies involving toxins, radioactive materials, and other chemical agents making the termination of evacuations problematic through examination of the causes and correlates of warning behavior and evacuation identified in the disaster research literature (e.g., Mileti et al. 1975, pp. 35-56; Quarantelli 1980; Drabek 1986, pp. 70-131). The contrast between a "typical" natural disaster evacuation and some of the toxic evacuations summarized above is extreme, but the contrast should bring to light the difficulties that may be expected in situations falling somewhere between the two extremes such as an earthquake in a major urban area where the return of residents is complicated by delays in the inspection of buildings, by the frequent occurrence of aftershocks, or by damage to lifelines and the infrastructure.

The termination of toxic evacuations involves more conflict than the initiation of evacuation in advance of natural disasters. Not only the presence of conflict but also the type of conflict makes termination of toxic evacuations more problematic. There is likely to be conflict between evacuees and the public officials responsible for the evacuation and its termination as well as conflict among evacuees themselves. Some of the dimensions of conflict can be identified from the previous examples.

Of the dimensions of conflict in the relationship between evacuees and public officials, one that is characteristic of toxic evacuations is conflict over the level of danger remaining, that is, whether it is safe for evacuees to return. Evacuees typically are more skeptical about levels of safety than officials, the reverse of the case in natural disasters where evacuees often begin returning before officials feel that it is safe to do so. Such skepticism often leads evacuees to commission their own analyses or to enlist volunteers (science faculty from local universities, for example) to evaluate independently the level of risk extant. Evaluations conducted on the

counted on to vary in their conclusions as well. Therefore, the results of these independent analyses are frequently be at odds with the "official analyses" analyses upon which the decision to issue the "all-clear" is based.

Another dimension of conflict between evacuees and public officials involves different ways of viewing the costs of evacuating. After initially considering the threat to public safety sufficient to justify evacuation, public officials become increasingly cost-conscious as the evacuation drags on and estimates of total public expenditures (for overtime pay, for special monitoring, for tax loss due to business interruption and work stoppage, etc.) are assembled. The normative tendency to "err on the safe side" recedes as does the normative prohibition to speak publicly about costs in times of crisis (Stallings 1988). In Thompson's words (1967, pp. 52-54), norms emphasizing efficiency that were temporarily overridden by norms giving higher priority to effectiveness reestablish their supremacy. Evacuees, on the other hand, are less likely to admit that the costs of evacuation now outweigh the benefits.

Evacuees and public officials responsible for toxic evacuations are also likely to disagree on the extent to which the problems that led to the evacuation in the first place are manageable or controllable. The success of an all-clear message depends in part on convincing evacuees that efforts to negate the source of danger have been effective. It is not enough to say that things have somehow improved. Usually one purpose of an all-clear message is to demonstrate that conditions are now safe for returning because plant operators have succeeded in containing radioactive gases, because workers have succeeded in sealing up leaching chemicals with non-porous materials, etc. Evacuees, with the evacuation itself providing persuasive evidence, may be less persuaded that the situation is so amenable to human control. Signaling that things are now under control is more difficult due to the existence of extremely negative cultural images surrounding toxic and chemical agents, images that conjure up some of our worst fears of runaway technology as a manifestation of evil (e.g., Wilkins 1986).

A second form of conflict in toxic evacuations making their termination problematic occurs among evacuees themselves. There is often wide disagreement about the advisability of returning. An initial hypothesis is that the reluctance to return covaries with the same factors that covary with the willingness to evacuate. For example, families with young children should be more reluctant to return than the elderly.

The level of conflict is exacerbated by at least three other conditions more likely to characterize toxic than natural disaster evacuations. The longer the duration of evacuation, the greater the conflict both between

evacuees and public officials and among the evacuees themselves. Even in con sensual emergencies such as natural disasters, crisis norms supporting the "therapeutic community" (Fritz 1961, pp. 688-692) give way over time to greater contentiousness underscored by the term "brick bat" phase (Moore 1958, p. 315). Toxic evacuations are especially likely to be lengthy ones because the harmful agents are difficult to measure and knowledge about how to remove or control them is lacking (see Clarke 1989).

Secondly, toxic evacuations involve chemical agents that frequently are invisible to lay persons. There may be no independent clues that the emergency has ended. This makes both evacuees and public officials responsible for issuing the all-clear dependent upon experts. Such dependence can intensify strain in already contentious relationships. A further source of conflict intensification arises when officials are unable to guarantee that even the absence of current symptoms does not rule out the future occurrence of negative consequences in the future (e.g., birth defects in unborn infants). (On the other hand, absence of independent evidence on the status of the emergency reduces one potential source of contradictory information as in the case of a building which looks sound to the untrained eye has in fact sustained serious earthquake damage, or when a drought emergency continues even though it is raining heavily).

Interaction among these separate lines of conflict is a third reason the termination of toxic evacuations is especially problematic. For example, negative evacuee reactions to the impression that public officials are more concerned about costs than safety intensify in combination with concerns about unknown future consequences. Suspicions are further aroused when the belief grows that the danger might reoccur. For example, termination of the BKK evacuation occurred at a time when residents knew of the city council's support for plans to build a trash-to-energy conversion plant on top of the toxic waste landfill. The city was anxious that the site continue as a source of business tax revenue after its use as a toxic waste disposal facility ended, but homeowners' association leaders raised concerns that a large electrical generating plant would crack the earthen cap on toxic materials, allowing them once again to migrate into residential neighborhoods (Stallings forthcoming).

A second proposition follows from the first: **all-clear messages in toxic evacuations have less credibility than warnings in natural disasters.** There are at least four sources of the lesser credibility of all-clear messages under these circumstances. One reason all-clear messages are less likely to be credible is a lack of trust in the organizations responsible for issuing the all-clear. In toxic emergencies a single agency (e.g., the EPA, a state health

department, etc.) is likely to be responsible for preventing such incidents in the first place, for containing or controlling them when they occur, and foe deciding when conditions are safe for evacuees to return. For example, operators at TMI were exclusively responsible for maintaining plant safety, for bringing the accident under control when it did occur, and for providing public officials (including the President of the United States) with all information about the status of conditions inside the reactor. In a flood the Corps of Engineers is responsible for structural mitigation (prevention), the National Guard may have taken charge of sandbagging (containment), but the mayor or some other local public official, perhaps in consultation with heads of city departments (police, building safety, public works) decides when to issue the all-clear. Apart from its singular responsibility, the toxic evacuation itself is evidence that the agency failed to carry out at least part of its responsibility.

Public trust in such an agency is further undermined when if the agency is perceived as having withheld information, deceived people with misinformation, or displayed a lack of competence in handling the emergency. Examples are abundant in the Times Beach case. Rural Missourians already evidenced a lack of trust in government in general and in the federal government in particular. The EPA "scandals" raised questions about Rita Lavelle's handling of the Super fund and about agency administrator Ann Burford's competence. In handling the Times Beach case itself, the EPA seemed continually to be caught off guard, first in the fall of 1982 by the Environmental Defense Fund's public disclosure of the list of 55 actual and potential dioxin sites in Missouri and then by the joint advisory of Christmas 1982 from the CDC (the agency did not seem to "have its act together" and the various federal departments did not seem to be "on the same page").

Second, evaluations by the organization responsible for deciding it is safe to return are likely to be contested by analysts working for or siding with evacuees. One might call this the Second Law of Experts—equal and opposing viewpoints about safe versus unsafe conditions among risk professionals. Even ten years after the original buy-out of homes at Love Canal, for example, social movement organizations are contesting the official view that it is safe to reoccupy the homes purchased by the government. Governmental agencies may disagree among themselves on the level of danger remaining (e.g., Clarke 1989) and whether it is safe to permit evacuees to return. Conflict between agencies from different levels of government are especially likely (e.g., Levine 1982). In the BKK case, the City of West Covina sued the state health department several times over a period of years to force it to hold a public hearing that would declare the landfill to be a

All-clear messages also have less credibility because evacuees typically have no personal experience with the types of threats involved. Past experience with the impending threat is in general not correlated with evacuation in natural disasters not because prior experience makes no difference but because people respond to warnings in opposing ways depending on the nature of their previous experience with the threat and its consequences (Drabek 1986, p. 107-108). Those who have experienced negative consequences are more likely to evacuate when warned than, for example, those who have "been through these things dozens of times, and they never amount to anything." Since few people have had direct, personal experience with toxic agents, "prior experience" in this case is the result of exposure to television, motion picture, and other images of threats. These images are by and large frightening ones, further increasing the skepticism with which the all-clear is received.

Finally, all-clear messages tend to have less credibility than natural disaster warnings because they tend to be more ambiguous. Information in general about toxic emergencies tend to be less clear cut, definitive, and unequivocal (e.g., "advisories" during the emergency at TMI, suggestions that those who feel "uncomfortable" should leave, etc.) and more likely to be inconsistent (e.g., official statements during the TMI emergency that no evacuation is called for in the face of news accounts of a massive evacuation already underway). One reason for ambiguity is the sensitivity of public officials to the possibility (indeed, certainty) of litigation. Politicians or agency administrators who unequivocally state that all is well, the danger has passed, and the threat is gone risk exposure to future liability if unanticipated consequences later develop. Their public comments, furthermore, are likely to be sprinkled with technical terms taken out of their scientific context such as "the probability of serious disease is not significantly greater now than before the incident began." While perhaps technically and legally correct, such statements justify the decision to allow return. The result is a message full of qualifiers and other carefully modulated expressions that "reading between the lines," gives the impression of being only partially truthful.

The principal consequence of the lessened credibility of all-clear messages in toxic evacuations is a greater reluctance to return than in natural disasters. Before deciding what to do, potential evacuees in natural disasters typically respond to warnings by seeking more information that can confirm both the reality and the urgency of the threat. Confirmation typically comes in the form of duplicate messages (as from other authorities, friends, etc.), from direct observation of other cues (e.g., it has been raining for more than

and observation of secondary cues such as unusual police activity, the establishment of roadblocks, and the departure of others in advance of impact.

Confirmatory behavior as a response to all-clear messages is inherently more problematic. Direct observation of conditions by evacuees themselves is usually not possible. Seeking independent information such as by hiring experts or consultants is expensive, but this impediment is frequently off-set by experts, especially from academia, who voluntarily contribute their services (e.g., Levine 1982, pp. 91-133). Another difficulty confirming all-clear messages is the existence of contradictory information. Typical is the situation in which the government's analysis supports a return while independent analysis secured by evacuees themselves is less unequivocal about the absence of harm and the appropriateness of terminating the evacuation. If conflicting information is correlated with reluctance to evacuate in natural disasters (Drabek 1986, pp. 104-105), then conflicting information in the termination phase should be correlated with a reluctance to return in toxic evacuations. Further, friends and relatives may be divided in their opinions regarding the advisability of returning.

CONCLUSION

This paper is an attempt to call attention to two aspects of evacuations that we know relatively little about (Quarantelli 1980, p. 130), the issuance of an "all-clear" message and the decision to return. In natural disasters the principal problem is evacuees trying to return before officials give the "all-clear" (Quarantelli 1980, pp. 130-134). In toxic evacuations, the problem is often overcoming evacuees' reluctance to return even after the all-clear. Homeowners may conclude that a "normal life" at that location is out of the question. Yet a home represents the principal source of savings for most people, and the balance between the threat of economic loss and the threat to family health may be a difficult one to strike. At the very least evacuees may want to be compensated for their losses such as declining property values, lost business or wages, and physical or emotional damages. In more extreme cases, evacuees may refuse to return and demand that the government buy their abandoned homes, citing precedents set by buy-outs at Love Canal and Times Beach.

I followed a strategy that made the all-clear message analogous to the warning message in natural disasters and the decision to return analogous to the decision to leave. I then examined variables that previous research has shown to explain the beginning of natural disaster evacuations in an

effort to suggest reasons why the termination of toxic evacuations is generally more problematic.

This preliminary inquiry suggests the need for research on two aspects of terminating evacuations. On the one hand, studies of how organizations decide that conditions warrant the issuance of an "all-clear" are needed. An excellent example is Clarke's (1989) analysis of interorganizational decision-making in the case of a dioxin-contaminated office building in Binghamton, New York. On the other hand, studies are needed of the intra- and inter-family dynamics of the decision to return. This could include analyses of the operation of real estate markets in the aftermath of toxic chemical evacuations and of how market forces impinge on the decision to return.

Two points for policy makers to consider are dear even from the research which now exists. First, resolution of inter organizational conflict **precedes** and **determines** the shape of scientific analyses that form the basis of an all-clear decision, not the reverse. That is, all-dear decisions are matters of power not science. Only after ownership of the situation is established and organizational domains staked out can the process of evaluating the safety of conditions become definitive (Clarke 1989; Stallings forthcoming). A large part of the reason that the decision to end evacuations following natural disasters is so unproblematic is that organizational ownership and domain are clear and uncontested. Public officials should be aware that scientific evaluation does not resolve inter organizational disputes; rather, scientific evaluation follows the prior resolution of organization disputes.

Second, the problematic ending of toxic evacuations in large measure appears to be a product of the **tarnished reputation** of the responsible organization. The greater the level of inter organizational conflict, the more inconsistent, ambiguous, or contradictory the official statements over time, the more the appearance that officials are being less than forthright in the interest of reducing the costs of evacuation, etc., the less credibility the all-clear message will have and the more difficult will be families' decisions to return. Toxic emergencies offer more opportunities for organizations to tarnish their reputations than do natural disasters. The price of allowing this to happen can be high.

Some of the examples used here have been extreme cases (Times Beach, Love Canal). More common are situations involving the BKK Landfill. All the examples made the same two points: ending evacuations can be a complicated process, and we need to know about it.

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